Alternative: Utilize San Juan-Chama Project Water

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1. Summary of the Alternative

The objective of this alternative is to beneficially use, within the Jemez y Sangre water planning region, all of the 10,835 acre-feet of the San Juan-Chama (SJ-C) project water collectively contracted by governmental entities in the region. These entities are the City and County of Santa Fe, San Juan Pueblo, Los Alamos County, Pojoaque Valley Irrigation District, and the City of Española.

Authorized by Congress in 1962, the SJ-C Project brings Colorado River Basin water from the San Juan Mountains in southwestern Colorado across the continental divide and into the Rio Grande Basin of northern New Mexico. A series of diversion structures and tunnels operated by the U.S. Bureau of Reclamation diverts water from three tributaries of the San Juan River and delivers it for storage in Heron Reservoir located on Willow Creek just above its confluence with the Rio Chama. The SJ-C Project is a participating project of the Colorado River Storage Project and provides a little less than 7 percent of New Mexico's share under the Upper Colorado River Compact. Authorized uses for the 96,200 acre-feet of the annual firm yield of the SJ-C Project is to provide water for irrigation, municipal, domestic, and industrial uses in the Rio Grande Basin above Elephant Butte Reservoir. SJ-C Project water also provides incidental recreation and fish and wildlife benefits.

The other SJ-C contractors, all outside of the Jemez y Sangre region, are City of Albuquerque, Middle Rio Grande Conservancy District, Jicarilla Apache Nation, Town of Belen, Town of Bernalillo, Village of Los Lunas, Town of Red River, Town of Taos, and Village of Taos Ski Valley. An additional 2,990 acre-feet is allocated, but currently uncontracted, to the Taos area. An additional 5,000 acre-feet is authorized to compensate for evaporation losses from the permanent recreation pool in Cochiti Reservoir.

Currently, the Pojoaque Valley Irrigation District (PVID), the City of Española, and the City of Santa Fe are the contractors within the Jemez y Sangre water planning region that have the means to use their SJ-C Project water. The New Mexico Office of the State Engineer (OSE) directs the release of contracted water to offset calculated effects of pumping on the Rio Grande by the Cities of Española and Santa Fe. Consumption by the PVID on the Pojoaque River and tributaries is offset by exchange in accordance with calculations performed by the U.S. Bureau of Reclamation as approved by the Rio Grande Compact Commission. The City of Santa Fe has at times, when Article VII of the Rio Grande Compact is in force, stored some of its SJ-C water by exchange with Santa Fe River water in the Santa Fe River Reservoirs. That water was then directly consumed upon release. Article VII of the Compact prohibits the City from increasing the storage of Rio Grande water in those reservoirs whenever Usable Water in Rio Grande Project storage falls below 400,000 acre-feet. Contractors in the region have, on occasion, leased SJ-C water to the Bureau of Reclamation or water users in the Middle Rio Grande.

This alternative, therefore, would consist of various projects to actively divert and deliver water to users in the region, thereby increasing the water available for use within the region. The SJ-C contracts are for a total of 10,835 acre-feet to be used consumptively; consequently, projects that can result in 100 percent consumptive use of the SJ-C waters are considered.

Diversion of the SJ-C waters for use within the region would alter Rio Grande flows, especially between points of diversion and points where return flows discharge to surface water. If return flows are credited only for groundwater recharge and are therefore not discharged to the river, then flows in the Rio Grande will diminish.

2. Technical Feasibility

Table 1 summarizes SJ-C contractors within the Jemez y Sangre region, the annual amount of water under contract, and the type of contract with the Bureau of Reclamation. Contractors with a water service contract are presently in the National Environmental Policy Act (NEPA) process of converting their contracts to a repayment contract.

Table 1. San Juan-Chama Project Water Contractors in the Jemez y Sangre Water Planning Region

Contractor	Contract Amount (acre-feet per year)	Type of Contract	Year of Renewal
City/County Santa Fe	5,605	Water service	2016
San Juan Pueblo	2,000	Repayment	none
Los Alamos County	1,200	Water service	2017
Pojoaque Valley Irrigation District	1,030	Repayment	none
City of Española	1,000	Water service	2017

SJ-C contractors have three options to use their contracted water: (1) directly (or in the case of infiltration galleries, indirectly) divert the water, (2) use SJ-C water to offset the effects of groundwater pumping where a hydrologic connection between the well field and the Rio Grande exists, or (3) exchange SJ-C water for use of native water at another location. All three options are technically possible, as discussed in Sections 2.1 through 2.3.

2.1 Direct Diversion of San Juan-Chama Water

Direct diversion of SJ-C water is technically feasible, although at this time no contractors are directly diverting Project water from the Rio Grande. The San Juan Pueblo does have irrigation diversion dams in place that could be used in the future but has not yet diverted any SJ-C water.

New diversion could be accomplished by construction of a diversion dam on the river, whereby surface water would be directly diverted, or by constructing infiltration galleries or horizontal collector wells under the bed of the river, which would in effect “pull” the river water through the river substrate. A pilot gallery horizontal collector well has been installed on San Ildefonso Pueblo land and is currently being evaluated.

The City of Santa Fe currently is actively developing plans for a project to divert SJ-C water from the Rio Grande. The City of Española has recently initiated investigations to either withdraw its contracted water directly from Abiquiu Reservoir (a form of direct diversion) and transport it to the city in a closed pipeline or divert it from the channel of the Rio Grande.

Regardless of the diversion method, extensive technical studies would be required prior to implementation of the diversion. Alternatives for diversion require modeling to evaluate options and engineering studies to evaluate options, designs, and costs. Likewise, the transport, treatment, and integration of the SJ-C water into existing infrastructures, while all technically feasible, would have to be studied.

Because municipalities generate a high percentage of effluent (50 to 60 percent) and because the SJ-C water can be 100 percent consumptively utilized, the SJ-C contractors have an opportunity to divert more than their annual allocation as long as the return flow is measured and other water right users are not impaired. Return flow credits could be obtained through any method of diverting SJ-C water.

In order to consumptively use 100 percent of the SJ-C water, the contractor must be able to prove to the New Mexico Office of the State Engineer (OSE) that 100 percent of the "delivery water" (the amount "over-diverted" to permit the 100 percent consumption) is returned to the river. If there are any exercised water rights between the point(s) of SJ-C diversions and the point(s) of return flow, significant technical issues will likely arise regarding potential impairment of others' water rights.

Where the SJ-C contractor can demonstrate that return flow will result in no loss to the system or impairment of downstream users, the SJ-C contractor will most likely be able to use all of their contracted amounts. Lined ditches or pipes may be required to manage or eliminate conveyance losses of the return flow water. If the return flow is discharged to groundwater, there will be technical issues associated with the method of groundwater recharge and, presumably, subsequent recovery.

2.2 Offset Groundwater Pumping

The technical feasibility of using SJ-C water to offset groundwater pumping is entirely dependent upon the geology surrounding the well field, which establishes the connectivity between the deep wells and the surface water system. The more porous and barrier-free the geologic material, the greater the impact groundwater pumping has on the river, in this case the

Rio Grande or the Rio Chama. The better the connectivity, the more efficient use of SJ-C water will be.

Ultimately, the OSE, through the use of hydrologic models, determines the quantitative effects of groundwater pumping on a river. For example, in the Jemez y Sangre planning region, the City of Santa Fe began using SJ-C water in 1972 to offset the effects of its groundwater pumping program on the Rio Grande. (The City leased SJ-C water from the City of Albuquerque from 1972 until 1976, when Santa Fe began diverting its own SJ-C contract water.) The pumping impacts have increased each year (2,552 acre-feet in 1999). When the practice began, it was thought that the system would be managed at an equilibrium point, that is, the entire annual allocation of SJ-C water would be used to offset the effects of pumping on the Rio Grande. This approach was thought to be an inexpensive method of using the water. However, the yield of the aquifer has been less than expected, and the City is not able to pump enough water to use its full SJ-C allocation. This shortfall, coupled with the increasingly scarce tributary water rights, has prompted the City to pursue other options for diverting SJ-C water.

Where SJ-C water is used to offset the stream impacts from an existing well field, a transfer to a direct diversion may not increase that contractor's total supply, even though the SJ-C water would be fully utilized.

2.3 Exchange of San Juan-Chama Water for Native Surface Water

Where adequate tributary water supplies are located closer to and/or upgradient from an SJ-C contractor's area of need, it would be technically possible to use the native water and replace it downstream, in the Rio Grande, with SJ-C water released for that purpose. The technical considerations to capture and transport the tributary water would be the same as those for diverting water from the Rio Grande, but desirable locations could reduce the costs. The lack of adequate water supplies and the likelihood of impairment of other water rights render this option unlikely.

The PVID is currently using all of its SJ-C water (1,030 acre-feet) through surface diversions, by storing Rio Nambe water in the Nambe Falls Reservoir (also constructed under the SJ-C

Project) and exchanging it for SJ-C water released from Heron Reservoir. The stored water is subsequently diverted downstream of the dam through a series of small diversions on the Rio Nambe.

Santa Fe has also exchanged Santa Fe River water for SJ-C water in 8 of the past 24 years. These exchanges efficiently utilize the SJ-C water and limited storage space available to Santa Fe. In years when Elephant Butte and Caballo Reservoirs have less than 400,000 acre-feet of Usable Water in storage, New Mexico is prevented from increasing the amount of water held in post-Compact reservoirs. Under Article VI of the Compact, New Mexico must retain in storage an amount equivalent to its accrued debit. Under Article VIII, Texas, during the month of January, may call upon the release of this debit storage sufficient to bring the amount of Usable Water in project storage to 600,000 acre-feet by March 1. These exchanges have been made not to protect post-Compact storage, but so the City could continue to use its storage space in the canyon reservoirs.

The exchange steps are:

1. Store Santa Fe River water in the canyon reservoirs and call it SJ-C water by exchange.

2. Release an equivalent amount of Santa Fe SJ-C water, including conveyance losses, from Heron or Abiquiu Reservoirs.

3. Use the SJ-C water in the canyon reservoirs to meet demand, as necessary.

3. Financial Feasibility

Costs of any new diversion, transport, and treatment systems would be significant. Estimated costs for the City of Albuquerque's San Juan-Chama Drinking Water Project, comprising diversion, treatment and treated-water transmission, is around $200 to $250 million, depending on the diversion alternative. The preliminary estimate for the City of Santa Fe's surface water diversion is $61 million. Santa Fe's estimates for the expansion of its well complex (a less

feasible option due to the scarcity of additional available water rights) is $25 million and for the horizontal collector wells, $34 million.

Public financing for such structures would be required. Such financing may be obtained through various means including federal appropriations, government bonds, federal funding sources (e.g., Safe Drinking Water Act Revolving Loan Fund), and state funding sources. Funding for large infrastructure projects usually takes many years and multiple sustained efforts to obtain since many different sources are involved.

4. Legal Feasibility

Any system to divert and consumptively use SJ-C water will require an OSE permit to appropriate that water. Applicants may initiate a request to appropriate surface waters by first filing a notice to appropriate and then filing an application to appropriate (NMSA 1978, §72-5-1 (1907)). The notice is not required but establishes the applicant's priority date (which may not be relevant in the case of SJ-C water) and allows time to prepare the application. After filing a notice, the applicant has up to 3 years to file the application and still have the appropriation relate back to the filing date of the notice (State Engineer Rules and Regulations, Surface Waters, II.B (August 1953)). The State Engineer will then determine whether a permit may be issued:

> Upon the receipt of the proofs of publication . . . the state engineer shall determine, from the evidence presented by the parties interested, from such surveys of the water supply as may be available and from the records, whether there is unappropriated water available for the benefit of the applicant. If so, and if the proposed appropriation is not contrary to the conservation of water within the state and is not detrimental to the public welfare of the state, the state engineer shall endorse his approval on the application, which shall become a permit to appropriate water. (NMSA 1978, Section 72-5-6)

It is likely that other SJ-C contractors will seek a permit from the State Engineer to divert significantly more water than the amount for which they have contracted, in order to consume the full amount of SJ-C water in their contract. For example, the City of Albuquerque is seeking

a State Engineer permit to divert approximately double the amount of its SJ-C contract, based on its calculations that half the water diverted will be returned to the river as wastewater return flows. In this circumstance, a contractor will, in addition to seeking a permit for a new appropriation of its SJ-C water, also be seeking a permit to divert "native" Rio Grande water and return it at a different location, where the contractor's treated wastewater effluent returns to the river system. A system that calls for diverting additional native water above and beyond the permitted SJ-C water, in order to consume all of the SJ-C water and not return any of it to the river, would require obtaining additional water rights, water rights that must be senior enough in date to provide the desired level of security. That is because all native water in the river is fully appropriated and the State Engineer would have to be assured that the proposed use of water will not impair downstream water users.

The question arises whether SJ-C contractors can assume that they will receive 100 percent of their contracted deliveries every year. Although this is a complex question that might ultimately be decided in the courts, the short answer is no. We say this even though, to date, contractors have always been able to receive the full amount of contracted water. The reason that contractors should be cautious is primarily that the SJ-C contracts allow for prorated reduced deliveries in the event of a shortage. Although the definition of shortage is currently being discussed in legal arenas, it is assumed with reason that when the SJ-C Project was authorized, and contracts subsequently entered into, "shortage" referred to hydrologic conditions in the San Juan River Basin. However, there is some contemporary thinking in different quarters that the shortages could also be associated with other needs, such as federally listed endangered species, or Native American water rights considerations. Nevertheless, SJ-C contractors may reasonably assume that they will usually receive most or all of the water for which they have contracted.

Using SJ-C water will also require compliance with the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA). NEPA compliance will be required if there is any federal action involvement (e.g. funding, permits--both virtually certain). Compliance with the ESA, through the U.S. Fish & Wildlife Service, can be fully anticipated because of projects' potential direct or indirect effects on the Rio Grande silvery minnow and the southwestern willow flycatcher and their associated proposed or designated critical habitats. Depending on the

outcome of the ongoing negotiations, the Middle Rio Grande ESA Collaborative Program might or might not achieve compliance with the ESA for other SJ-C water contractors.

Finally, some SJ-C contractors in the planning region have fixed-term water service contracts with an expiration date, in contrast to repayment contracts, which are in essence perpetual (Table 1). Discussions with the Bureau of Reclamation have been initiated by some of contractors in the Jemez y Sangre planning region to convert their water service contracts into repayment contracts. Such contract modifications would likewise require compliance with NEPA and the ESA. As with any action to divert and use contracted SJ-C water, a key issue will be providing assurance to the U.S. Fish & Wildlife Service that making the contracts perpetual will not jeopardize or adversely affect endangered species

5. Effectiveness in Either Increasing the Available Supply or Reducing the Projected Demand

As discussed in Section 2, there are five contractors for SJ-C water rights within the region, with a total of 10,835 acre-feet of water rights. Taking into account the current usage of SJ-C water by the PVID and the City of Santa Fe, and assuming that all of the contractors can beneficially use all of their SJ-C water rights within the region and that the City of Santa Fe continues its groundwater pumping program at its current production level, the net gain to the region's consumptive water supply would be around 7,000 to 7,500 acre-feet per year. If Santa Fe curtailed its current pumping program when its diversion project came on line, as is being anticipated, the region's net gain of consumptive water would be about 4,500 acre-feet per year.

6. Environmental Implications

The environmental implications of increasing the use of SJ-C contracted water through direct diversions would be two-fold: impacts from construction activities and modifications to the Rio Chama and Rio Grande hydrographs. Construction impacts, although they should not be minimized, usually can be fully addressed during the planning, design, and implementation phases. Many construction impacts to the environment can be avoided, and others can be

minimized and mitigated. Certainly the riparian ecosystems are of special concern, and the extent of disturbances resulting from delivery pipeline construction would need to be fully addressed.

The effects on the rivers' hydrographs are more complicated. On one hand, establishing more predictable water delivery regimes down the Rio Chama and conjunctively managing the SJ-C deliveries with other water delivery activities upstream from the point(s) of diversion provide opportunities to enhance river conditions for aquatic species. However, downstream of the point(s) of diversion, the withdrawals could likely be considered a negative impact on the downstream riverine and riparian system, all the way to Elephant Butte Reservoir. Loss of streamflow and recharge to the shallow aquifer could affect riparian bosques and river function in the following manner.

- Loss of native vegetation
- Spread of exotics
- Increased risk of fire,
- Lower habitat quality for wildlife
- Alteration of ecosystem functioning

Integrated water management decisions could help mitigate these impacts.

7. Socioeconomic Impacts

The Jemez y Sangre region of northern New Mexico is distinguished by its rural and agricultural character, predominantly Indian and Hispano population, localized land-based economies, and pockets of persistent poverty. In particular, its Indian and Hispano populations represent some of the most unique cultures in the world, products of a long history of continuous human habitation, adaptation, and cultural blending. Land-based Indian and Hispano cultures still thrive, carrying on centuries-old cultural traditions that include distinctive land-use and settlement patterns, agricultural and irrigation practices, natural resource stewardship practices, social relations, religious activities, and architecture. An example is the ancient acequia

tradition, which is vital both as a sustainable irrigation system for subsistence and market agriculture and as part of the social glue that holds together rural communities.

The survival of these deeply rooted local traditions is essential for the continuity of rural culture and communities and, in turn, for the local tourism industry, which is built in large part upon the singular cultural and historical personality of the region. Preservation of these traditions is therefore an important consideration in determining the socioeconomic and cultural impacts of regional water planning.

Though contrary to the traditional watershed-based wisdom of keeping water rights tied to the land and local area of origin, SJ-C water is nonetheless available and ought to be put to some use. The question with this bonus water is what constitutes "beneficial use" for the collective public welfare. Consumptively utilizing 100 percent of the SJ-C contract water would directly benefit all SJ-C water right holders, with the indirect socioeconomic and cultural benefit of reducing the desire for and pressure on upstream rural and agricultural surface water rights to support municipal and industrial needs. Additional available streamflow would probably reduce costs for all water users. Planners should also carefully consider the public welfare and conservation benefits of utilizing SJ-C water for downstream environmental purposes, including ecosystem restoration and endangered species support.

Indirect negative impacts would include the public perception by local rural irrigators of such a great volume of water flowing past acequia headgates but unavailable to them, and public opposition to SJ-C water being strictly consumptively used rather than aiding downstream environmental concerns.

8. Actions Needed to Implement/Ease of Implementation

In order to fully use all the SJ-C Project water collectively contracted by governmental entities in the region, the following actions are needed:

- Convert SJ-C fixed-term water service contracts to perpetual contracts (if possible).

- Conduct preliminary feasibility studies of alternatives for diverting and using SJ-C-contracted water (this should be integrated into a NEPA environmental document).

- Integrate results of alternatives study into contractors' water supply plans

- Submit to OSE a notice of intent to file application and the application for permit itself, and obtain permit.

- Ensure NEPA compliance.

- Ensure ESA compliance.

9. Summary of Advantages and Disadvantages

Bringing SJ-C water into the region could significantly increase the total amount of water available to the region. However, numerous technical, legal, and environmental issues would need resolution prior to implementing this alternative.